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Dissertation on tubercle

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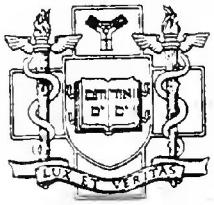

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VIII.

Dissertation
on
Tubercle.

By
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Tubercle.

The term tubercle is derived from the latin tuberculum, signifying simply a small tumour. It is now employed to designate a peculiar morbid deposit, connected with a particular diathesis, termed the tuberculous. The knowledge of the existence of this product is of ancient as well as of modern date. Hippocrates, but, as was usual with pathology was involved in profound obscurity. He was left for modern investigation, to unfold the laws which govern its development, trace its subsequent changes, and control its effects. In theory, the true nature, causation, progress, and termination of tubercle has been a favorite object of the investigations of its most eminent pathologists of the age. These researches have elucidated much that was formerly obscure in its pathology; but from the various opinions entertained by different writers, it is evident, that our knowledge of tubercle is yet imperfect.

[illegible] [illegible] difficult [illegible] investigation,
and embodied by the [illegible] to get over
[illegible], numerous hypotheses have been made
[illegible] satisfactory to their authors, yet meeting
with limited favor, still unsettled, and accu-
rate microscopic investigations that we must look
for a thorough knowledge of this subject.
The universal prevalence and remarkable fatality
of this disease, invests it with peculiar interest.
The particular [illegible] of its development, consti-
tuting phthisis, it is estimated that it causes at
least one fifth part of the mortality in the
human race. In discussing this subject I
can merely [illegible] a comparison of various au-
thorities, take such conclusions as may seem to me
most consistent with the appearances presented and
the laws which govern living action. We find a
variety of terms and many distinguished pathol-
gists in many points in the history of tubercle,—
as to its [illegible], formation, form, locality, na-
ture, mode of softening, and vascularity. The
cause of many of these discussions, Dr.

Cazenave observes, that the form, consistence, and compositions of tubercles vary with the nature of the part in which they are found, and the period at which they are examined, their appearance is therefore the result of changing circumstances, and hence cannot be uniform.

There are two kinds of tubercle, — the opake, yellowish tubercle, and the granular, semitransparent. The deposition of tuberculous matter is not peculiar to the lungs, but tubercular infiltration, Laennec considered this only a more liquid state of the tuberculous matter, poured into the parenchyma of the lungs, and this view is generally adopted, from the fact that it is never found in other diseases, and is always associated with other varieties of tubercle. Laennec has perceived, frequently, small yellow tubercular points or crude tubercle in the midst of this substance. The observations of Louis are not in accordance, as he has never seen this appearance. Such evidence however is only negative, and cannot dispute its existence.

the usual nature of the second, [illegible] of tubercle, hard granular, miliary, but [illegible] some of much larger size, they are small granular tubercles ranging from the size of a millet seed to that of a pea. It was the fact of their existing simultaneously in examination, with the first, mentioned, both [illegible] and [illegible] equal stage as the first stage of it, [illegible] those were first discovered, evidently these cartilaginous and in a nature entirely distinct from tubercle, constituting a peculiar form of phthisis commonly existing alone, & [illegible] associated with the tubercular. Actual succeeding them to be internal & pulmonary vesicles, the result of chronic inflammation, others many of them as small as millet seed, consider them as not form of tubercle, but not necessarily the primary or always preceding the opaque variety. As to which they take they take that the latter kind is [illegible] where the former is not observed. But the real point to which of the two forms must invariably existing together

and from their having been obtained in the first early stages of transformation, there can be no doubt of their tubercular nature, & appears also that what is usually described as crude tubercle is very often not immediately as such, but a stage of the mild or granulations. The first-formed effusion attains height, successively from above downwards in the lungs is at first small, semi-transparent, granulations, crude tubercles, and lastly gray, semi-transparent granulations is very strong evidence of the truth of this position, this being one which will hereafter call the direction of the tubercular deposition.

Form of Tubercle. Tubercles are usually described as being of a round form, but this condition so frequently in the different stages of matter, is by no means invariably present, it is probably an accidental circumstance depending upon their density, or the nature of the tissue in which they are deposited. Minute particles of tuberculous matter are first effused, & then enlarge by subsequent accretions, hence when effused in a soft substance like the brain, they assume a rounded form, from the uniform pressure

which they receive in exchange. When deposited in the nearest tissue, they take the place of the cells which it incorporates. In the tissue proper they assume, according to the particular seat of their deposition, three principal forms. They are called globular forms, when they completely fill the cells, and leave a central cavity, when compared to the secretory surface. In the vesicles, they take the cylindrical form of the receptacle.

Pathology of Tubercle

The various morbid changes which take place in the body, may be divided into analogous and heterologous—the former embracing all those products which have an analogy in some of the natural tissues of the body—the latter presenting no such resemblance. Fatty tumour—bony tissue, are analogous, the fibrous tumour is of the same class.

Tubercle like cancer resembling of the tissues of the body, and therefore heterologous.

The humours as a cause of disease.

On this subject there has been much controversy, arising principally it would seem from a misapplication of the term inflammation, which some use almost synonymous with diseased action, others mean by it simply common phlegmonous inflammation. In this latter restricted sense, it can have no agency in the production, other than as an exciting cause, of that deleterious state of the constitution in a tuberculous diathesis. Diseased action is governed by fixed laws, and hence is always uniform, under similar circumstances. Now in the tuberculous constitution never manifests itself among its products, showing that some other condition necessary to its development, without which inflammation symptoms of inflammation are susceptible, and in which anatomical investigation exhibits no trace of its effects. It is usually attended with inflammation, and symptoms thereof arising are often the first evidence we have of its existence. Thus the effect has been mistaken for the cause, a disease originating in the constitution, but previously unknown, from a

want of [illegible] nutriment, or from the irritation
[illegible] to which it appears. Correct views
of the proximate cause of tubercle, & of the exact
nature of the specific action upon which depends
its deposit, are important as establishing the indications
of treatment. It was formerly considered inflam-
matory, and hence blood was unsparingly
the use of mercury to the full ptyalism, the
means to sublime an inflammation existing, even
the irritation of the tubercular matter, & existing
perhaps from common causes, and tending to produce
the localization of the disease in a strumous con-
stitution. Still it should be done with caution, or
the powerful constitution debased, and depleting measures
however necessary, can never remove this diathesis.

The local nature of the tubercular deathes
it seems difficult to determine. Since we suppose that
it depends upon a specific virus or poison in the blood
this poison like every other producing phenomena
peculiar to itself. In this respect it is made
analogous to syphilis, [illegible] the hard, small sore
and [illegible] cancer, although in these diseases

chemical tests have never been able to detect the presence of such virus in the circulation. This virus may be transmitted from parent to child, and the fact well authenticated of tubercular deposit in living animals having actually taken place to a considerable extent in the foetus, is supposed to favour the above theory. The existence however of any such poison cannot be demonstrated, and in our present ignorance of the modus operandi of poisons, & do. not concern that the settlement of the question would add much to our knowledge of the pathology of the disease. It is not necessary to suppose, in the case above mentioned that the tubercular deposition in the foetus was caused by a contagious principle received from the mother, as the syphilitic virus has been communicated. It might result from the low degree of vitality of the materials of organization furnished by the mother, these not having the power of transforming themselves into healthy tissues. The task to which I consider the true theory of the formation of tubercle.

The foetus is matured, from

ul at the tubercles, because in general degenerating vitality, or living matter of the nutritive or assimilating function, becomes incapable of transformation into complete fibre, or healthy growing matter called cells, but these cells, having no germinal vesicle, or abortive in their growth, and from that imperfectly organizable material tubercle,

Dr Carpenter says—the difference between fat-cells, and that of healthy organizable material would appear to be this, that the former is composed of the albuminous constituents of the blood, a more chemical compound, which is not prepared to undergo organization until it has passed through the capillaries of fibrin, whilst the latter is composed of the fibrinous which possesses within itself the power of organization and only requires the contact of living tissue to enable it to pass into a regular structure.

It may be inferred from this view that tubercle is in the blood, as is also the material of a portion of the unhealthy constituents, but the author classes the material of tubercle as peculiar

a imperfectly organizable, making a subsequent change after it leaves the circulating system. It thus finally results from a local defect in the assimilating process, but an abnormal state of the blood is the primary cause of this deranged action by affording imperfect materials for healthy organization. The disease is therefore usually constitutional or if tubercle existed ready formed in the circulation.

Seat of Tubercle.

Pathologists have usually considered the cellular tissue the most common seat of tubercle. Dr Carswell however asserts that in relation to the different tissues, systems and organs of the body, the mucous system is by far the most frequent seat of tuberculous matter, and that its seat of election is the free surface of mucous membranes. In the midst of these conflicting views it is difficult to decide which tissue is the favorite seat of the deposition, and owing to changes which must take place in the structure of the part before observations can be made, the settlement of the question must be very difficult.

The cellular tissue must be a very common seat of tubercle, as in the lungs, and other organs in which structure mucous tissue does not enter. Locality. — Tubercle has been observed in almost every organ of the body, and where the disease is strongly marked, it exists in very many of them simultaneously.

It probably never limits itself to one organ for any great length of time. Tissue structure however are much more readily affected than others, differing in this respect at different periods of life.

In the adult the lungs are known to be almost invariably affected, if the disease has located itself at all. M. Louis in three hundred and fifty eight cases found, but one exception. Other pathologists have found the exceptions more numerous. Thus Lombard in one hundred cases found fourteen exceptions. M. Chomel in one hundred and fifty two autopsies found the lungs free from tubercles but six times. It seems to be the more common opinion at the present time that the left lung is more frequently affected than the right. This is the

opinion of Louis, Carswell, Gross, and most modern authors. In opposition we have the high authority of Laennec, Abercrombie, Louis, Bayle, Andral, Rokitansky, Hope, Walshe, Chomel, Chambers, and Mackintosh. The question therefore cannot be considered as settled. The appearance in a given number of cases in one lung, more frequently than in the other, may be merely accidental. The summit of the lung is almost invariably the primary seat of the deposition, and this seems to have reference to the several lobes of which the lung consists. Thus portions of the superior lobes are often affected, when parts of the lobe next inferior, corresponding in height are perfectly sound. The superior and posterior part of the upper lobe of the lung is usually the first seat of tubercles. Dr Carswell observes that there is no exception to this rule where the deposition has not been preceded by local disease, such as circumscribed bronchitis, pneumonia or pleurisy. Various theories have been advanced to account for this localization determination of the disease to particular portions of the lungs. Carswell considering that the

tuberculous matter is separated from the blood and deposited on the free surface of mucous and serous tissues, I think that it may depend in a great measure on a greater degree of facility afforded to its escape. The inferior lobes have much greater functional activity, or velocity of motion, than facilitating the expulsion of the matter deposited. Dr. while he admits that the confined and compressed state of the superior lobes of the respiratory organs, should exert an injurious influence predisposing them to disease suggests an explanation derived from the laws of gravity.

The superior lobes in the erect position of the body, are not as accessible to the blood, and from this cause congestions are more liable to arise, determining the development of tubercle. All these explanations of a well known fact, must be mere conjecture, but the view of Carswell appears more plausible, not that there is much greater facility afforded to the escape of the tubercular matter from the freer expansion allowed to the lower lobes of the lungs, but from the increased vigor which the circulation and nutrition of the organs portions acquire from the

condition. The greater frequency of tubercular deposition in the lungs of adults than of children may admit perhaps of explanation. It has been suggested that this deposition is facilitated by passive congestion. When the lungs are kept in bigness exercise, especially freely such congestions are prevented. The function of the lungs by crying in infancy and by the exercise of the vocal organs attending the active and invigorating sports of childhood must have a powerful influence in keeping up a free circulation and promoting the nutrition of these organs. Next to the lungs in point of frequency of the tubercular deposition, according to Louis are the small intestines and this is confined in the great majority of cases says Carswell to the lower portion of the ileum, more frequently to the glands of Peyer than of Brunner. The numerous glands are affected in the following order in point of frequency:- mesenteric, cervical and lumbar. The spleen is seldom affected in the adult: the same may be said of the brain. Of the serous membranes the pleura and peritoneum are frequently

appeals the pericardium but seldom.

Tubercles are also found in the urinary and repro-
ductive organs, and occasionally in the nervous
system. No organ or tissue of the body may be
free from the disease though in some as in cartil-
age and muscle they have seldom been detected.

Progress of Tubercle.

Tubercle may remain dormant in
the system for an indefinite period but eventually
it becomes softened, and by the ulceration of the
neighboring part it passes into channels by which
it escapes from the system. The mode by which
this softening is effected is not clearly explained.
Some who consider tubercle to be an organizable
product believe it is partially, or wholly effected by
changes resulting from its own internal action.
Others on the contrary who consider it to be inorganic
consider it as the mechanical result of fluids
secreted from the surrounding parts, as the effect
of irritation and consequent inflammation caused
by their action. Some however who advocate the
inorganic nature of tubercle, believe it capable of

undergoing chemical changes. The evidence from anatomical investigations appears contradictory.

Laennec asserts that tubercle always begins to soften in the centre. Cornil on the contrary believing this to be impossible, from his theory of the inorganic nature of the product - was driven to the necessity of explaining the cause of an appearance observed by many pathologists. This he has done satisfactorily to himself, and probably to others - assuming that the tubercular matter is generally deposited upon the air cells and bronchia, it may be conceived that the surface of either a central depression early will thus be left filled with mucus, secreted by vessels of the membrane. Again, tubercular products existing in separate points, approximate by successive deposits and in this manner portions of lung may become surrounded by tubercular matter, and these portions becoming inflamed and disorganized produce the appearance above. This ingenious mode of accounting for the appearances cannot settle the question.

The inability of the vital a chemical change in the tuberculous to take place must first be proved.

Cornil, Clark and Alix, three of the most distinguished pathologists of Great Britain, admit the inorganic nature of tubercle, Sanner and Lucas think so, that it always takes place at the centre, and Andral that it may occur at any part of the substance. Gross, who considers tuberculous matter as identical with coagulable lymph would necessarily believe it susceptible of organization under certain circumstances.

The view which I have taken of the pathology of tubercle, supposes it to be endowed with a degree of vitality. As an objection to this opinion its non-vascularity has been asserted in proof of which, is stated its inability to be injected. This is not conclusive, admitting it to be true, vascularity is not essential to organization, vitality. Muta cellular tissues are nourished by means of cells In this manner plants receive their nourishment. Very recently however, certain British pathologists have succeeded in injecting tubercle, thus establishing their vitality beyond a doubt. We infer therefore that the softening of tubercle may arise spontaneously

independent of any cutaneous influence. This change may first arise in any portion of the product. The relately of the disease affords no reason for supposing its softening invariably appears in the centre. I think there can be no doubt that this process is frequently effected also by the secreting of the tissues surrounding tubercles as the result of the irritation produced. I am aware of the objection of M. Louis founded on the appearance of the mucous membrane in the vicinity of tubercles.

He ascertained that the mucous membrane of the bronchia frequently did not present any alteration in the neighborhood of crude tubercles whilst it was almost always thickened and of a red color in the vicinity of cavities. From this circumstance he was led to conclude that this inflamation being posterior to the softening of the tubercles cannot be considered as their cause, but rather as the effect of the irritation of the matter poured into the bronchia from the cavities. This argument though plausible I do not deem conclusive. The softened matter may produce irritation in a very probable from the additional fact of the ulcerations of the trachea and larynx being related at-

the posterior part, and on the laryngeal surface of the epiglottis, these parts coming in contact with a greater quantity of the discharge. It is a remarkable fact that tubercle may exist for a length of time in the lungs without exciting inflamation, and thus, we find the membrane in their vicinity appearently healthy as above stated. This circumstance appears to me to afford additional evidence of the vitality of tubercle, as it is difficult to conceive how an inorganic substance, not encysted can remain to such a degree harmless in the system. But eventually and perhaps in consequence of the tubercular matter not being able to sustain its vitality inflamation arises, and liquids are effused, breaking down the mass. This effect is immediate, and might readily be mistaken as has been by some, for the cause of the inflamation of the membrane, the action is probably reciprocal, tubercle first producing inflamation, and it producing it, by which it is broken down, and this again increasing the inflamation. We have thus ascribed the softening of tubercle to two causes—first to a spontaneous change in the product itself, and secondly from the ulceration of the surrounding tissues, as the effect of its irritation

In an article on the general pathology of tubercle, I do not propose to treat of all the morbid phenomena, to which it may give rise. These must of course vary with the nature of its locality. The functions of the various organs in which it is seated must be impeded from the first, and if the disease progresses eventually destroyed. Hence it follows that the danger depends upon the importance of this function in the animal economy. But as we have seen tubercular deposition is never long limited to one organ, and in the adult the lungs, as we have seen, are almost invariably affected.

The curability of tubercular disease is now established beyond a doubt. At an early period of life, the disease is often confined to the lymphatic glands. The tubercular matter of which these scrofulous enlargements consist, is often discharged by suppuration, and it occasionally disappears even without this process, — by absorption, similar results take place in the lungs in that form of the disease, constituting phthisis. This expulsion of the product by sphacelation and expectoration, would often cure the disease, did it not depend upon a morbid diathesis, which remaining, such depositions are constantly taking place. There can be no doubt that spontaneous cure is occasionally effected in this manner. All the physical signs of tubercle have been present — and indicating

the existence of a cavity, and subsequently, when the patient has been destroyed by some other affection, a cicatrix has been found in that portion of the lung, in which the excavation had formerly existed. There is still another termination of tubercle by which a cure is effected. All the animal portion may be absorbed, leaving a cretaceous mass, which becomes enclosed by an accidental tissue, formed by an effusion of coagulable lymph, and may thus remain dormant in the system through life. These shall by concretions are sometimes detected of the appearance resembling dry mortar.

A description of the symptoms, and treatment of tubercle, in its various stages, and complications, with regard to different regions, does not properly belong to a general dissertation on the subject.

Of the various predisposing and exciting causes of tubercle my limits will not allow me to speak, important as they must be considered.

In a word, they may be stated to be all those agencies which tend to depress the vital powers of the system, and which act especially to derange the process of nutrition, — the development of tubercle resulting, as we have endeavored to prove, from a deficiency of vitality, in the nutritive, or assimilating function.

H. H. Kemp M.D.